AMENDMENTS TO THE SPECIFICATION:

Please amend the paragraph beginning at page 1, line 32, as follows:

In order for the mobile to be able to receive data from a base station using OFDM for downlink transmission, the mobile must be time-synchronised to the base station. The mobile needs to know the beginning of the useful symbol duration. In a cellular system with unsynchronised base ~~station~~ stations, the timing of different base stations may drift and a mobile ~~according to prior art~~ can ~~in that case~~ not easily detect any data sent from another base station with a different time synchronisation.

Please amend the paragraph beginning at page 2, line 7, as follows:

In order to initiate a handover, the mobile needs to detect the existence of at least a second base station within communication distance. The mobile also needs to know some identity number, or cell ID, of this second base station. ~~Since~~ If the mobile ~~in a general case~~ is unsynchronised to the second base station, then the mobile has to search for signals that might originate from a second base station. The mobile has to assume a preliminary time synchronisation and determine if there is any meaningful information available when using such a time synchronisation. In case the information is un-interpretable, the preliminary time synchronisation has to be changed and a new evaluation of any meaningful information is performed. Such ~~fingerprint~~ matching between expected and received signal patterns is performed for a number of possible base stations. This procedure is demanding in terms of processing power, and thereby also in terms of battery resources of the mobile station. Furthermore, in a typical case, such a process will also take a considerable time, during which the call may be lost due to the weak present connection.

Please amend the paragraph beginning at page 2, line 26, as follows:

A problem with prior art devices and methods using OFDM is that there are no easily available possibilities to communicate with or even receiving broadcast information from unsynchronised nodes. Further problems are that procedures for achieving a synchronisation are slow, they demand high processing power, and they require ~~considerably~~ considerable battery power.

Please amend the paragraph beginning at page 2, line 32, as follows:

An object ~~of the present invention~~ is to provide methods and devices for enabling a communication between unsynchronised nodes within an OFDM scheme without too high demands in terms of computational and electric power. A further object ~~of the present invention~~ is to achieve methods and devices for broadcasting of information between unsynchronised nodes.

Please amend the paragraph beginning at page 3, line 23, as follows:

Since the above ~~general concept~~ technique gives possibilities for information exchange without being perfectly synchronised, such signalling can advantageously be used for purposes of e.g. searching for base stations during handover attempts, or broadcasting during paging procedures. The present ~~invention~~ technology significantly reduces the computational and power demands during cell search and idle mode. Furthermore, the times for executing handover or for connecting to a base station will be significantly reduced.

Please amend the paragraph beginning at page 4, line 16, as follows:

FIG. 6 is a diagram illustrating carriers of an OFDM system and such carriers reserved for unsynchronised communication~~ according to the present invention~~;

Please amend the paragraph beginning at page 4, line 25, as follows:

FIGS. 8C and 8D are diagrams illustrating the transmission and reception of sinusoidal signals between unsynchronised nodes according to <u>example </u>embodiments~~ of the present invention~~;

Please amend the paragraph beginning at page 4, line 28, as follows:

FIGS. 9 and 10 are diagrams illustrating the transmission and reception of sinusoidal signals carrying information between unsynchronised nodes according to <u>example </u>embodiments~~ of the present invention~~;

Please amend the paragraph beginning at page 4, line 31, as follows:

FIG. 11A is a diagram illustrating the communication of phase shift keying information on sinusoidal signals between unsynchronised nodes according to an <u>example </u>embodiment~~ of the present invention~~;

Please amend the paragraph beginning at page 5, line 5, as follows:

FIGS. 13 and 14 are block diagrams of transmitters according to <u>example </u>embodiments~~ of the present invention~~;

Please amend the paragraph beginning at page 5, line 7, as follows:

FIGS. 15 and 16 are block diagrams of receivers according to example embodiments ~~of the present invention~~; and

Please amend the paragraph beginning at page 5, line 9, as follows:

FIG. 17 is a flow diagram illustrating the main steps in an example embodiment of a method according to the ~~present invention~~ described technology.

Please amend the paragraph beginning at page 9, line 5, as follows:

Fig. 6 illustrates ~~a~~ an example carrier utilisation for OFDM ~~according to the present invention~~. In a typical OFDM system, a large number of carriers are used. In a typical system, 4000 carriers could be in use, spread over a frequency range 110. The carriers are equidistant, i.e., there is a constant frequency difference between two successive carriers.

Please amend the paragraph beginning at page 9, line 11, as follows:

~~One of the basic concepts of the present invention is the introduction of a~~ A new channel is introduced that fits into the OFDM frame-work, which is dedicated to transmission of information between nodes that are not necessarily time-synchronised. In ~~the most~~ a basic example embodiment ~~of this invention~~, a sub-set f_1, f_2, ..., f_m of carriers is reserved for transmitting such information. Preferably, the sub-set is also equidistant in frequency, i.e., each carrier in the sub-set is separated from the previous carrier in the sub-set by the same frequency difference.

Please amend the paragraph beginning at page 11, line 2, as follows:

Fig. 8C illustrates the signalling principles between unsynchronised nodes according to an example embodiment ~~of the present invention~~. The node N1 transmits on a carrier reserved for unsynchronised communication that is assigned to node N1. ~~According to the present invention, a~~ A sinusoidal signal 99 is transmitted during at least a time period corresponding to two consecutive OFDM symbols. In the present embodiment, the length corresponds to two OFDM symbols, as indicated by the arrow and reference "n=2". This sinusoidal signal 99 is continuously transmitted, regardless of any normal roll-on/roll-off or CP sections. The node N2 is unsynchronised with node N1 as in Fig. 8B, by a time reference difference of δ. The time template of node N2 is as illustrated in the middle of the figure. At the lower part of Fig. 8C the received or extracted signal is illustrated. ~~It is obvious that the~~ The first extracted OFDM symbol, of which only a part is seen in the figure, contains un-interpretable information. A minus sign ("-") indicates this useless signal in the figure. However, a second extracted OFDM signal 98 does only contain one single sinusoidal frequency. This OFDM symbol can therefore be associated with useful information, which is indicated with a star ("*"). The third extracted OFDM signal again contains non-sinusoidal components at the end of the OFDM signal period and any information of this symbol is of no use.

Please amend the paragraph beginning at page 11, line 31, as follows:

In Fig. 8D, an alternative example embodiment ~~of the present invention~~ is illustrated. Here, the duration of the pure sinusoidal signal 99 transmitted from node N1 corresponds to three successive OFDM symbols. The received and extracted OFDM symbols comprise one nonsense symbol and two symbols comprising pure sinusoidal signals 98. The frequency of these two sinusoidal signals 98 is identical. However, there is a relative phase shift α, which uniquely

depends on, and therefore can be calculated from, the relation between the absolute frequency and the magnitude of the CP and roll-on/roll-off durations. It is thus easily concluded if the two detected sinusoidal signals 98 originates from the same transmitted sinusoidal signal 99.

Please amend the paragraph beginning at page 12, line 9, as follows:

~~In the most basic form of the present invention, the~~ The mere existence of sinusoidal signals 98 can be utilised. As mentioned before, each base station is assigned a set of reserved frequencies. The mobile terminal can then listen and try to detect the presence or existence of an un-modulated sinusoid signal 98 that belongs to the reserved set of frequencies. When the mobile detects the presence of a signal on a frequency reserved for unsynchronised communication, it can extract at least the following 4 items of information.

Please amend the paragraph beginning at page 13, line 7, as follows:

Furthermore, since all base stations, including the one that the mobile is currently communicating with are transmitting un-modulated sinusoids on reserved frequencies the mobile can also perform some early steps towards synchronisation. Usually the synchronisation is divided into several parts including OFDM symbol synchronisation, frame synchronisation (a frame is assumed to consist of several OFDM symbols) and possibly also super-frame synchronisation (super-frame is assumed to consist of several frames). By detecting the information transmitted on the sub-carriers reserved for un-synchronous communication, the mobile can obtain ~~ruff~~ rough frame synchronisation and super-frame synchronisation. Furthermore, the uncertainty region of the OFDM symbol synchronisation can be reduced. By comparing the detected information on the un-synchronous sub-carriers with the symbols in

between that were discarded, an estimate of the OFDM symbol synchronisation error can be obtained. If the detected information symbols on average have much higher received energy than the discarded symbols then the OFDM symbol synchronisation error is large. If, on the other hand, the discarded symbols have almost equally large received energy as the detected symbols, then the OFDM symbol synchronisation is much more accurate. This information can be utilised in the later search of ~~perfect~~ better OFDM symbol synchronisation, in case the mobile is to perform a handover to the new un-synchronised base station. ~~Perfect~~ Satisfactory frequency synchronisation to the base station is achieved by locking on to the transmitted un-modulated sinusoid of the reserved frequency.

Please amend the paragraph beginning at page 13, line 31, as follows:

Thus, one ~~basic~~ feature ~~of the invention~~ is that a sub-set of carriers is reserved for unsynchronised communication, e.g. for cell search. When the mobile terminal detects the presence of such a carrier it will know that it is transmitted from another base station. The mobile can detect this signal even if it is not time synchronised to the base station that transmits it. The frequency of the reserved carrier that the mobile detects is a direct mapping of the cell ID of the base station that transmits the signal.

Please amend the paragraph beginning at page 14, line 16, as follows:

A few examples of modulation formats ~~compatible with the present invention~~ are presented below.

Please amend the paragraph beginning at page 14, line 17, as follows:

Fig. 9 illustrates an example embodiment of unsynchronised communication ~~according to the present invention~~. In this figure, the roll-on/roll-off and CP sections are neglected for simplify the reading of the figures. However, these are of course present in analogy with previous figures. In this embodiment, an amplitude modulation is used. In this very embodiment, the amplitude modulation consists of turning the sinusoidal signal 99 on and off, respectively according to certain rules. A transmitting node N1 provides a sinusoidal signal 99 of a frequency corresponding to a reserved carrier. For sending a "1", the node N1 turns on the sinusoidal signal 99 during two consecutive OFDM symbols. For sending a "0", the node N1 turns off the sinusoidal signal 99 during two consecutive OFDM symbols. In the example given in Fig. 9, the node N1 transmits the data sequence "1101", by turning on the sinusoidal signal 99 during 2 times 2 OFDM symbol durations, by turning it off during 2 OFDM symbol durations and finally turning it on again during 2 OFDM symbol durations. Note that there is no phase shift allowed between the first and second OFDM symbol, between the third and fourth OFDM symbol and between the seventh and eighth OFDM symbol. However, if required, there might be a phase shift between the second and third OFDM symbol.

Please amend the paragraph beginning at page 17, line 28, as follows:

The ~~present invention~~ technology in this case can be applied for unsynchronised communication in all kinds of OFDM systems. Such communication is of particular interest in certain situations in cellular communication. One situation is for cell search in a handover procedure. Fig. 12A illustrates a communications system, where three base stations 20 are within radio communication distance with a mobile terminal 30. The mobile terminal is connected and synchronised to the closest base station by an active link 60. However, in order to assist at

handover, the mobile terminal 30 continuously or quasi-continuously searches for neighbour base stations. Such communication has to be performed over unsynchronised links 65. The information that is of particular interest during an initial search stage is first of all the existence of neighbour base stations, and further information like e.g. the cell load in other base stations. This information is relevant when taking any decision that a handover procedure should be initiated. When the actual decision to make a handover is taken, further information is of interest. Information about which random access resources are available in other cells becomes important, as well as a ruff idea of the frame synchronisation in the cells selected for handover. A synchronisation message can for instance be transmitted as a special broadcast information on the reserved carriers.

Please amend the paragraph beginning at page 21, line 10, as follows:

~~The~~ An example method ~~according to the present invention can be summarised by~~ is described referring to a flow diagram of Fig. 17~~[[,]] in which the main steps of an embodiment of a method according to the present invention are illustrated~~. The procedure starts in step 200. In step 202, a number of carriers of an OFDM system are reserved for unsynchronised communication. In step 204, a sinusoidal signal is transmitted at such a reserved carrier over a time period corresponding to at least two consecutive OFDM symbols. The sinusoidal signal is received in step 206 and interpreted in step 208. The procedure ends in step 210.